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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N. Monroe Street • Spokane, Washington 99205-1295 • (509) 456-2926

March 25, 2003

Ms. Beverly Gaines
U S Environmental Protection Agency
ECL-110
1200 Sixth Avenue
Seattle, Washington 98101

Dear Ms. Gaines:

In accordance with your request, attached is the final periodic review document for the GE/Spokane Site. Public notice and opportunity to comment was conducted on this document between February 14 and March 17, 2003.

If you have any questions, please contact me at (509) 329-3562.

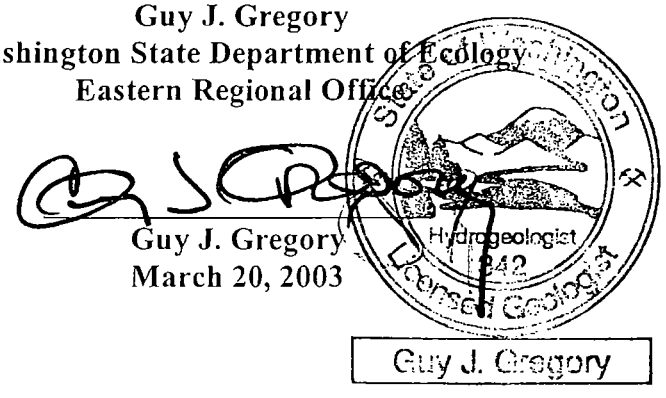
Sincerely,

Guy J. Gregory
Senior Hydrogeologist
Toxics Cleanup Program
Eastern Regional Office

# Periodic Review

## General Electric/Spokane Site
## 1997-2002


**Prepared by:**
Guy J. Gregory
Washington State Department of Ecology
Eastern Regional Office


Guy J. Gregory
March 20, 2003

# 1. INTRODUCTION

This Periodic Review of Remedial Action document confirms post-cleanup site conditions and monitoring data to assure human health and the environment are being protected at the General Electric/Spokane site (GE/Spokane Site). General Electric Company (GE) constructed the remedial action in accordance with cleanup action design documents required by the GE/Spokane Site Cleanup Action Plan (CAP) dated March 29, 1993, and amended February 3, 1997 (Ecology, 1997). Ecology and EPA issued a Construction Complete determination for the remedial actions in 1999. Ground-water monitoring has continued since site construction to ensure ground water quality standards are met. Ecology conducted an inspection of this site and elements of the remedial action on November 7, 2002.

# 2. SUMMARY OF SITE CONDITIONS

## 2.1. Site Description and History

The GE/Spokane Site is located at E. 4323 Mission Avenue, in Spokane, WA. (Figure 1), and is slightly less than 2 acres in area. GE operated a transformer service shop on the site from 1961 to 1980. The service shop site includes a parcel of GE-owned property and a building, an adjacent warehouse owned by Mr. Marvin Riley doing business as Federal Construction Company, and surrounding property developed as a power corridor by Washington Water Power Company, now Avista Corporation (Figure 2).

Transformer service operations caused oils containing PCBs to be released to site soils. In 1985, PCBs were detected in site soils. Three subsequent remedial investigations performed by GE contractors found PCBs in ground water and surface soils, as well as subsurface drainage features. In 1989, the site was placed on the National Priorities List. Remedial Investigations and Feasibility Studies were complete by 1992. Remedial actions, commencing in 1991, were complete in 1997. Actions at this site included the employment and evaluation of innovative treatment technologies and techniques. All portions of the site are available for industrial development; the Riley property has been cleaned to residential (unrestricted land use) cleanup levels (Bechtel, 1999).

## 2.2. Conclusions of Studies Conducted at the Site

During operations, site soils became contaminated with PCBs and Total Petroleum Hydrocarbons (TPH). Individual drainage structures (the most important being the West Dry Well) conducted these liquids to the subsurface, where the liquids ultimately encountered ground water. Ground water transported PCBs off GE-owned property. While no immediate threat to human health from other pathways was found, PCB chemicals represented a long-term risk to human health and the environment via ingestion and direct contact of site soils and ground water.

## 2.3. Remedial Action Objectives and Cleanup Levels

Remedial action objectives (RAO's), established in the Cleanup Action Plan (CAP, Ecology, 1993) and consistent through later amendments were prepared to mitigate the identified risk. For soil, these objectives were:

1. Reduce the potential for migration of PCB from soil to ground water to protect ground water quality; and
2. Prevent dermal contact or ingestion of soils to protect human health in an industrial exposure setting.

Concentrations necessary to achieve these objectives (cleanup levels) were: 10 mg/kg total PCB to protect ingestion in an industrial exposure scenario (above 15 feet below ground surface); 60 mg/kg total PCB to protect migration of PCB to ground water (below 15 feet below ground surface) and 200 mg/kg total petroleum hydrocarbons in all site soils. These cleanup levels were established in the CAP.

For ground water, the objectives were:

1. Prevent ingestion of PCB-bearing ground water; and
2. Prevent off-property migration of PCB-bearing ground water.

The cleanup level for PCBs established in the CAP was 0.1 ug/l, to be achieved in all wells on site. This cleanup level is based upon the practical quantitation limit of USEPA Method 8080 modified to achieve low detection limits. PCB concentrations were reported as Aroclors.

The following sections describe the actions completed to meet these objectives and mitigate the long-term risk (Bechtel, 1999).

## 2.4. Remedial Actions for Soil

In 1991, interim actions including fencing, structure demolition and removal, and soil covering, were taken to remedy immediate direct contact risks. An area of the site was constructed using site materials to perform a demonstration of the effectiveness of in-situ vitrification technology (ISV) in PCB destruction.

By 1992, remedial investigations and feasibility studies were complete. GE proposed that ISV be chosen as the remedial technology applied to clean up site soils once its effectiveness was demonstrated. Completing a Toxic Substances Control Act (TSCA) demonstration test and acquiring a TSCA operating permit for ISV was the required effectiveness demonstration.

Ecology's 1993 Cleanup Action Plan prepared in accordance with the Model Toxics Control Act established PCBs and Total Petroleum Hydrocarbons as chemicals of concern for site soils and PCBs as chemicals of concern in ground water. The CAP

established cleanup levels for these chemicals assuming industrial exposure. The CAP chose ISV as the preferred method to treat all site soils to those levels in agreement with GE. A consent decree implementing that CAP was signed in December 1993.

The ISV demonstration test was originally planned for 1991. The test was delayed until 1994 following failure of an Operational Acceptance Test of the ISV equipment at the vendor's Richland, Washington Test Site. The on-site 1994 demonstration of ISV was largely successful, but irregularities in performance sampling and analysis led to conditions on the permit issued by U.S. EPA (EPA, 1995). Cost information obtained during the demonstration test led to a reconsideration of the selected remedy. Ecology modified the remedy and consent decree in an Explanation of Significant Differences (Ecology, 1996) to allow off-site disposal of soils bearing low concentrations of PCBs because of substantial and disproportionate costs. Soils bearing high concentrations of PCBs, which otherwise would have been incinerated under TSCA rules, were vitrified on site in late 1996. Conditions on the EPA permit for ISV technology were removed as a result of these tests.

Deep West Dry Well soils, in contact with ground water, were grouted in 1996 to decrease their mobility and reduce PCB concentrations in ground water. A significant volume of those soils were removed and stockpiled on site and later vitrified.

Low concentration soils were excavated in 1997. GE excavated soils on Avista-owned property to the cleanup level of 10 mg/kg; Riley owned property had soils removed to 1 mg/kg, a level which does not require land use controls. A significantly greater volume of PCB bearing soil was encountered than predicted by Remedial Investigation data. Once most soils had been removed to the proper cleanup level except for those on GE-owned property, GE ceased excavation, contained the volume of remaining soils, and petitioned Ecology for a change in cleanup level. That petition was based upon consideration of the 1996 revisions to PCB toxicity published on the Integrated Risk Information System. Ecology denied this request. Ecology did, though, evaluate the protectiveness of containment measures implemented by GE on this small volume of site soils, and agreed the containment was protective. Ecology published a second Explanation of Significant Differences in late 1998 outlining this change, which became final after public notice and opportunity to comment January 28, 1999 (Ecology, 1999). The "construction complete" determination was issued shortly thereafter.

### 2.5. Remedial Action for Ground Water

The Remedial Investigation studies delineated a plume of PCB-bearing ground water extending off GE property. As noted above, some soils actions were taken to decrease PCB mobility or remove PCB and TPH soils from contact with ground water. Ecology's CAP called for institutional controls on affected property ground water use and for long-term monitoring to meet the remedial goal of prevention of ingestion of PCB-bearing ground water. That effort, implemented in 1994, is ongoing.

All actions taken since publication of the 1993 CAP are documented in detail in the Cleanup Action Report, final January 28, 1999 (Bechtel, 1998). Ground water monitoring reports are submitted in accordance with the consent decree four times per year and have been prepared by Golder Associates, Emcon, and IT, at various times.

## 3. FIVE YEAR REVIEW

Periodic review of the cleanup action is conducted no less frequently than every five years after the initiation of the cleanup action as specified in WAC 173-340-420. Periodic review is required at sites where:

- An institutional control and or financial assurance is required as part of the cleanup action;
- Where the cleanup level is based on a practical quantitation limit as provided for under WAC 173-340-707; and
- Where modifications to the default equations or assumptions using site-specific information would significantly increase the concentrations of hazardous substances remaining at the site after cleanup or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long term protection of human health and the environment.

In this case, institutional controls, in the form of land use and ground water withdrawal restrictions, are present on GE and neighboring property, and the cleanup level for PCBs in ground water was based upon a practical quantitation limit (Ecology, 1993).

Periodic review for the GE/Spokane site is also required under the terms of section XXIII of Consent Decree 93206059-3, as amended, between General Electric Company and Ecology. The factors Ecology considers to evaluate the protectiveness of a remedy are set in the Model Toxics Control Act Cleanup Regulation, WAC 173-340-420(4).

This evaluation is based upon review of quarterly and annual monitoring reports and compilation and evaluation of electronic data submittals. Additionally, phone contact was made with major adjacent property owners, and a site inspection was conducted. All correspondence was reviewed. The period of this review is from the 2nd Quarter 1997 monitoring event up to and including the 2nd quarter 2002 ground water monitoring event.

### 3.1. Are ongoing or completed cleanup actions, including engineered and institutional controls effective at limiting exposure to hazardous substances remaining at the site?

#### 3.1.1. Completed Cleanup Actions

##### 3.1.1.1. Vitrification and Removal Actions

The effectiveness of these actions at destroying chemicals or removing chemical bearing soils is outlined in the Cleanup Action Report (Bechtel, 1999). As cited in the Second Explanation of Significant Differences for the Cleanup Action at GE/Spokane (Ecology, 1999) 19,521 cubic yards of chemical-bearing soils were vitrified or removed from the GE/Spokane site. No hazardous substances from these materials remain on site.

Soil on the Riley property was removed to meet residential cleanup levels. No institutional controls are necessary for that property.

#### 3.1.1.2. Capping

Inspection of the site on November 7, 2002 indicated the site cap is intact. It is serving the purpose of diverting incident precipitation away from contained material, and preventing direct contact or inhalation of contaminated soils. See Appendix A, inspection photos.

#### 3.1.1.3. Deep Soil Grouting

Deep soil grouting was performed to minimize the mobility of PCB-bearing soils beneath the water table through decreasing the hydraulic conductivity of those soils and injecting the soils with reactive media which should increase the sorption capacity, thus solubility, of contained PCBs. Performance of this effort is evaluated through ground water monitoring.

#### 3.1.1.4. *Institutional Controls-Deed Restrictions*

Interviews were conducted with property owners Avista and the City of Spokane on November 5, 2002.

Deed restrictions on Avista property were not noted as a burden, no development has occurred.

The City of Spokane owns property downgradient of the facility, where wells MW-18 and 22 are located. No institutional control was required at the time of the CAP for the site as monitoring during the RI had not revealed PCB in this area. Performance monitoring since has revealed PCBs in ground water in MW-18. The City has had some difficulty developing the property because of these detections, attributable to the site and as yet unaddressed by institutional controls. There is a low risk of exposure to these chemicals on this property.

#### 3.1.1.5. Institutional Controls-Fencing

The November 7, 2002 inspection indicated the fences were secure and intact.

### 3.1.2. Ongoing Cleanup Actions

3.1.2.1. Ground water monitoring

The FCAP specified ground water monitoring to address ground water impacts. The objectives of that monitoring are described in the Ground Water Monitoring Plan (Bechtel, 1993). In general, the monitoring plan monitors site physical and chemical parameters to evaluate the performance of soil cleanup actions, and protect ground water resources.

The long term monitoring plan was implemented in 1994. To facilitate soil removal in 1996 and 1997, wells MW-2, MW-4, and MW-5 were abandoned in accordance with applicable rules. MW-21 replaced MW-4, MW-19 was placed in the rough center of the known PCB ground water occurrence, and MW-22 was placed to increase the capabilities of the ground water monitoring network at protecting the Spokane River resource down gradient of chemical occurrences, following discovery of PCBs in well MW-18. Figure 3 illustrates the locations and names of the current 10- well monitoring network.

Each well in the network is sampled quarterly for PCBs using USEPA Method 8082. A modified extraction procedure is employed (USEPA Manchester Laboratory 1991).

Results of this monitoring are submitted in accordance with the schedule in the Consent Decree as amended. General Electric Company has conducted additional monitoring, including VOC monitoring using USEPA Method 8260, generally in the 2nd quarterly event, and TPH monitoring, using EPA Method 418.1 (prior to 2001) and EPA Method 8015M. Changes of methods and associated issues are documented in the relevant quarterly and annual reports submitted on behalf of GE (see, for example, Golder, 2002). Detailed review of this VOC and TPH monitoring is not performed as it is not required by Ecology.

3.1.2.2. Summary of Ground Water Physical Measurements

Water levels on site indicate ground water flows primarily northwesterly across the site. Figure 3 is a typical map of the water table elevation at the site. Well MW-1 is located upgradient of the area of impacted soil, representing physical and chemical background. Ground water flow is dominantly horizontal, with some minor vertical components measured in the MW-9U and MW-9L well pair. Average hydraulic gradient over the monitoring period between MW-01 and MW-22 is approximately 0.002.

Figure 4 uses well data from MW-1 to illustrate water level history at the site since 1994. In general, site ground water elevations have varied over the monitoring period approximately 18 feet. The lowest measured water table elevation occurred in the Fall, 1994 event, while highest water levels occurred in the June, 2002 event. Over the reporting period, a general increase in water table elevation is exhibited. Water table elevation varies with the seasons, maximums generally occurring in the spring, and minimums in the late fall or winter quarters.
Water elevations generally rise over a short period of time, and decline over a long period.

3.1.2.3. Summary of PCBs in Ground Water

PCBs have been detected in current site ground water wells MW-10, 11, 18, 19, 20, and 21. MW-10 detected PCB only in the second quarter 2002 sampling event. The plume of PCB chemicals extends from the west dry well area to the northwest. Lateral extent of PCB bearing ground water is limited due to the velocity of ground water in this area, and the relatively narrow source area, grouted during 1997.

PCBs detected are classified as Aroclors. Aroclor 1260 is the most commonly detected PCB mixture, though Aroclor 1254 was detected in 6 out of 70 detections.

3.1.2.4. Data Quality

Data quality has been good throughout the review period. Detection limits have generally met a 0.05 ug/l quantitation limit for wells with detected PCBs. There is only one outlier. Laboratory qualifiers are minimal for a dataset this size.

Consequently, Ecology review of this dataset is conducted using unqualified and J qualified (estimated concentration) data from the dataset. Use of estimated concentration (J qualified) data is appropriate for purposes of this review, as trends, rather than absolute compliance with cleanup levels, are being evaluated. As PCB detections exceed cleanup levels at this time, no compliance evaluation is necessary.

3.1.2.5. Contaminant Trends

MW-5

MW-5 represents trends of PCB in ground water prior to soil remedial actions (Figure 5a). Concentrations of Aroclor 1260 approach the solubility limit of the chemical mixture. MW-5 was abandoned in 1996 to allow soil removal.

MW-11

Data from MW-11 (Figure 5b) indicates a peak in Aroclor concentrations at the beginning of the review period. This is probably due to site disturbance activities. Data suggest a decreasing trend since 2$^{nd}$ Quarter, 1997, with the exception of an anomalous peak in the 2$^{nd}$ quarter of 2000.

MW-18

A similar pattern to MW-11, (Figure 5c) with a peak in concentration in 2$^{nd}$ Quarter 1997, followed by a generally subtle but present decrease in the observed maximum concentration. Anomalous peaks in 2$^{nd}$ quarter 1999 and 1$^{st}$ quarter 2002, as well as subordinate peaks in concentration in other years, seem related to the sharp spring rise in elevation common in the aquifer.

MW-19

Monitoring in this well indicate values close to detection limits with the exception of detections of PCB in May or June (2nd quarter) sampling events. (Figure 5d)

MW-20

Contaminant trends in this well are generally flat, with the exception of the 1st Quarter (February) 2000 event, however highest concentrations again are generally associated with the sharp spring increase in water table elevation (Figure 5e).

MW-21

Slight detections occur in MW-21 associated with either the spring or summer ground water quality measurement. The concentration of those detections has increased from 0.053 ug/l to 0.2 ug/l (Figure 5f).

3.1.2.6. Ground Water Quality Conclusions

1. Cleanup levels have not been achieved in ground water at the point of compliance.

2. Some evidence suggests a residual source for remaining PCB in ground water. That evidence is largely the pattern of increasing PCB concentration with rising water table, suggesting residual PCB-bearing materials are draining out of a smear zone on a falling water table and made available for transport and/or dissolution on a rising water table.

3. Other models for PCB transport proposed by various entities at various times, i.e. facilitated transport of PCB through oil-phase TPH or solvents, transport via particulate measured as turbidity, etc, have been proposed. Supporting evidence to date is not sufficient to readily confirm or dismiss these models. Understanding the method of transport of PCBs at the site is important should additional remedial actions be required to achieve site cleanup levels.

3.1.3. Conclusions

While cleanup levels in ground water have not been achieved, both ongoing and completed cleanup actions as well as the engineered and institutional controls in place at the site are effective in limiting exposure to the remaining hazardous substances. Site inspection indicates all engineered controls on site are intact and functioning.

3.2. Is there new scientific information for individual hazardous substances or mixtures present at the site?

3.2.1. Toxicity values

EPA reassessed the toxicity of PCBs as Aroclors in 1997. That information was incorporated in the second ESD (Ecology; 1999).

3.2.2. Other Information

Significant advances in the understanding of transport, environmental fate, and ecological impacts of PCBs have come to light in the past 5 years. Current research seems to be focused on congener physical and chemical property evaluation and analysis of ecological exposure and human health effects. Aroclor Chemical analysis methods for PCBs have been significantly upgraded, allowing testing and quantitation of PCB congeners at very low concentrations.

Investigations by Ecology and others indicate PCBs in the Spokane River are a significant problem in both fish and sediments. Further investigations are beginning from known PCB sources. Aroclor analyses from all studies to date indicate PCBs from this site have not entered the Spokane River. Systematic congener monitoring has not been adopted for ground water monitoring at this site.

3.2.3. Summary

While our knowledge base of PCB chemicals is expanding rapidly, as yet little information is available which requires a reassessment of the cleanup at the GE/Spokane Site. New test methods may provide additional data for quantitative risk assessment, but that is not applicable to the GE site at this time.

3.3. Are there new applicable state and federal laws for hazardous substances present at the site?

3.3.1. Federal Rules

Federal Rules adopted or proposed since the 2nd Quarter, 1997 relevant to PCBs are as follows:

| Date | Title | Federal Register Citation |
|---|---|---|
| June 29, 1998 | *Disposal of Polychlorinated Biphenyls (PCBs);* **Final Rule** | 63 FR 35384 |
| June 24, 1999 | Technical and Procedural Amendments to TSCA Regulations - Disposal of Polychlorinated Biphenyls (PCBs); **Final Rule** | 64 FR 33755 |
| December 10, 1999 | Use Authorization for and Distribution in Commerce of Non-Liquid Polychlorinated Biphenyls; Notice of Availability; Partial Reopening of the Comment Period; **Proposed Rule** | 64 FR 69358 |

| | | |
|---|---|---|
| April 6, 2000 | Use Authorization for and Distribution in Commerce of Non-Liquid Polychlorinated Biphenyls; Notice of Availability; Partial Reopening of the Comment Period; Extension of Comment Period **Proposed Rule** | 65 FR 18018 |
| November 1, 2000 | Polychlorinated Biphenyls (PCBs); Return of PCB Waste From US Territories Outside the Customs Territory of the United States; **Proposed Rule** | 65 FR 65654 |
| March 30,2001 | Polychlorinated Biphenyls (PCBs); Return of PCB Waste From US Territories Outside the Customs Territory of the United States; **Final Rule** | 66 FR 17468 |
| April 2, 2001 | Reclassification of PCB and PCB-Contaminated Electrical Equipment; **Final Rule** | 66 FR 17602 |
| September 17, 2002 | Polychlorinated Biphenyls; Manufacturing (Import) Exemptions | 67 FR 58567 |

None of these rules are relevant or appropriate to the current status of the cleanup at the GE/Spokane Site.

3.3.2. State Rules

Principal state rules governing PCBs are the Dangerous Waste Regulation, WAC 173-303, and the Model Toxics Control Act Cleanup Regulation, WAC 173-340. The Dangerous Waste Regulations govern management of PCBs and some PCB-bearing materials containing between 2 and 50 mg/kg total PCB. Though modified since the CAP, no changes affect this cleanup.

Chapter 173-340 WAC governs cleanup sites. That regulation was modified effective in 2001. For PCBs, while cleanup levels set under various land use scenarios in that regulation changed in terms of cited authority (See WAC 173-340-900, Table 720-1, footnote s, for example), they did not change the applicable concentrations. No changes to MTCA affect this cleanup.

In January 2001 Ecology issued a strategy to continually reduce persistent, bioaccumulative toxins (PBTs) in Washington State. Ecology's PBT Strategy calls for continually reducing and, where possible, eliminating PBTs by the year 2020 through phasing out the use, production, and, where possible, releases of these chemicals. (Ecology, 2000). PCBs are one in a series of some 22 PBT's targeted through this policy effort. To date, no rules or regulations have been promulgated under this policy affecting this site.

3.3.3. Summary

No significant changes have occurred to applicable or relevant and appropriate state or federal laws which affect the site to date.

3.4. Have current and projected site and resource uses changed?

The projected use for the site remains industrial use, consistent with the current use of adjacent properties and the city and county comprehensive plan.

3.5. Are more permanent remedies available or practical?

Removal and disposal of soils which remain on GE property as a result of cessation of removal actions, as outlined in the Second ESD (Ecology, 1999) remains available. Ecology assumes increased charges of a second mobilization and GE's sacrifice of the economies of scale present during the 1997 removal period to deal with a relatively small volume of contaminated soil discourage any further GE-conducted removal.

3.6. Are improved analytical techniques available to evaluate compliance with cleanup levels?

3.6.1. Ground Water

The CAP recognized the limitations of then Method 8080, modified by the Manchester guidance with the objective of achieving a practical quantitation limit for PCB. Method 8080 is no longer a recognized analytical method in EPA laboratory publications. Today's Method 8082 is now the preferred method of analysis for PCB in ground water, and adapts well to achieving the required quantitation of PCB in ground water as demonstrated in the various quarterly and annual reports.

Sampled ground water is currently analyzed by USEPA Method 8082 (Level 4) with a modified extraction method (USEPA Manchester Laboratory SOP for Extraction of BNAs/PEST/PCB/OP-PEST in Water, USEPA Manchester Laboratory, 1991). PCB results are reported as Aroclors, or chemical mixtures.

USEPA Method 8082 has been modified since the CAP to include reporting of individual PCB congeners. Ecology contracted for split sampling to be taken in the 2$^{nd}$ quarter of 2002, using EPA Method 8082 modified to achieve low detection levels (SAIC 2002). The results of that monitoring are illustrated on figure 6.

Golder samples reported higher detections of PCB in MW-19 and MW-11 than SAIC. GE samples achieved a lower detection limit than SAIC samples in all wells. .

In addition to reporting Aroclors, Ecology required congener analysis be performed by the laboratory on the SAIC samples. Those data are indicated on figure 7, which shows detected congeners only. Congeners were detected in wells which detected Aroclors, and wells which had no Aroclors contained no PCB congeners. Higher concentration wells contained higher levels of congeners, but no correlation is apparent between the total detection of quantified congeners and the reported Aroclor concentration. Detection limits for the congeners are significantly lower than for Aroclor mixtures.

EPA Method 1668 (EPA, 1999) quantifies over 200 individual congeners. It has a method detection limit of approximately 5 picograms/l in ground water. This method is designed to provide data regarding toxicity equivalent concentrations for risk assessment. While this method is available, it is expensive, and data provided by the method is not necessary to meet the objectives of ground water remedial action at this time.

The advantage of congener methods in the context of this site is that they identify PCBs which otherwise may not report to an Aroclor analysis, thus enabling potential evaluation of biologic or other degradation processes. Method 8082 while reporting fewer congeners, has the advantage of being able to report both Aroclor and congener data, thus allowing a relationship with prior data to be established over time. The split sampling indicates that at this time Aroclor analysis detected the presence of PCBs at the same locations the congener analysis detected PCBs. Also, the detection limits achieved by the current analytical method are able to detect Aroclors at concentrations which allow quantification at the cleanup level.

While the congener analysis is more expensive than the current analysis and based on the detection limits achieved using the current analytical method, congener analysis does not seem to offer a significant benefit, future reductions in the cleanup level or reassessment of risk values for individual PCB congeners may necessitate adoption of a congener method.

### 3.6.2. Soil

No soil monitoring has been contemplated since confirmation monitoring occurred as part of the remedy (Bechtel, 1998).

### 3.6.3. Summary

The CAP did not contemplate congener analysis. Congener analysis is a more precise method for determining the presence or absence of PCB chemicals. While it appears that the current method remains appropriate for monitoring concentrations relative to the technology-based cleanup standard, congener analysis may be appropriate to used in the future to achieve the risk-based level. Method 8082 congeners appear adequate for this task and could be employed now to build a database available for use when risk-based cleanup levels are developed.

## 4. Conclusions

The remedy at GE/Spokane is generally protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled.

Additional actions are available which would enhance the protectiveness of the cleanup. They are:

1. GE should consider including congener analysis in the ground water monitoring program. Method 8082 is available to achieve that at reasonable cost with existing equipment.
2. Institutional controls, in the form of deed restrictions, should be emplaced on the properties where MW-18 and MW-22 are located. MW-18 has shown intermittent, but significant detections of PCB, attributable to the site, and the City of Spokane has encountered administrative problems in developing the property. Institutional controls in the form of deed restrictions are required by the FCAP to be placed on "the deeds of all properties where ground water is impacted."

However, overall, for the GE/Spokane site in 2002:

1. the remedy is functioning as intended by the decision documents;
2. the exposure assumptions, toxicity data, cleanup levels, and RAOs remain valid;
3. no additional information is available which could call into question the protectiveness of the remedy.

Ecology has determined in accordance with WAC 173-340-420(6) that neither of the recommendations above constitute a substantial change to the cleanup action, and thus no amendment of the cleanup action plan is required at this time. Furthermore, Ecology concludes in accordance with WAC 173-340-420(7), that given consideration of the factors in WAC 173-340-420(4), further periodic reviews are required. The schedule for the next periodic review is following submittal and incorporation of data gathered in the 2nd quarter 2007 ground water monitoring event.

5. References Cited

Bechtel, 1998, Final Cleanup Action Report, GE-Spokane Remedial Design/Remedial Action Project

Golder Associates, Inc., 2002: Fourth Quarter and Annual 2001 Groundwater Compliance Monitoring Report for General Electric Spokane Washington Site, January 29, 2002.

Ecology, 1993, Final Cleanup Action Plan, Former General Electric Spokane Shop, E. 4323 Mission Avenue, Spokane, WA, Exhibit B to Consent Decree 93206059-3

Ecology, 1996, Amendment to Cleanup Action Plan and Explanation of Significant Differences, GE/Spokane Site, Exhibit A to First Amendment to Consent Decree 93206059-3

Ecology, 1999, Amendment to Cleanup Action Plan and Explanation of Significant Differences Number 2, GE/Spokane Site, Consent Decree 93206059-3

Ecology, 2000: Proposed Strategy to Continually Reduce Persistent Bioaccumulative Toxins (PBTs) in Washington State; Ecology publication 00-03-054

SAIC, 2002: GE/Spokane Split Ground Water Sample Results Report; SAIC Report to Washington State Department of Ecology

U.S. EPA Manchester Laboratory, 1991: SOP for Extraction of BNAs/PEST/PCB/OP-PEST in Water

U.S. EPA, 1995, Approval to Dispose of Polychlorinated Biphenyls, issued to Geosafe Corporation, Oct. 31, 1995

U.S. EPA, 1999: Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS; EPA-821-R-00-002

Figure 1: Site Location Map

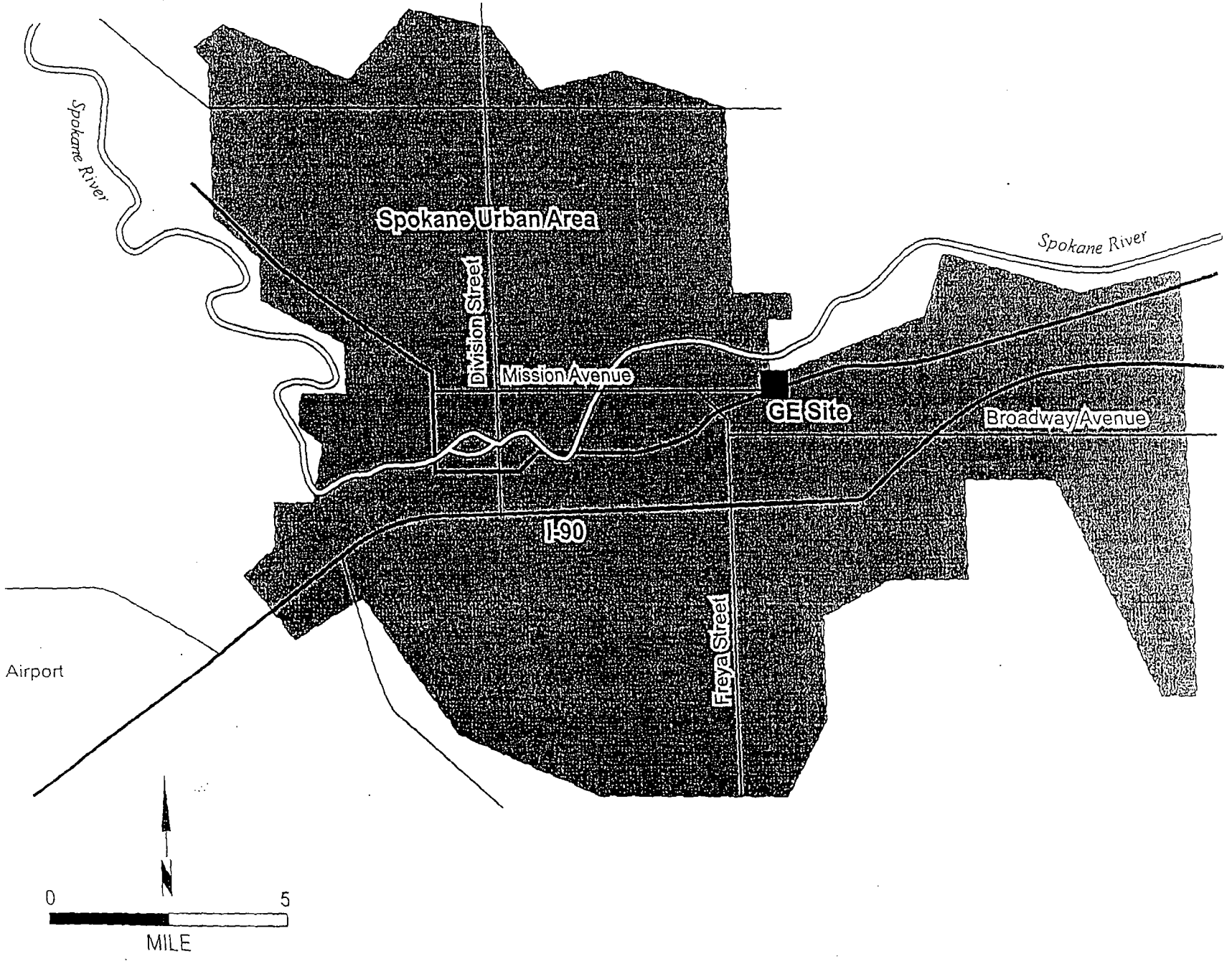


Figure 2: Property Ownership

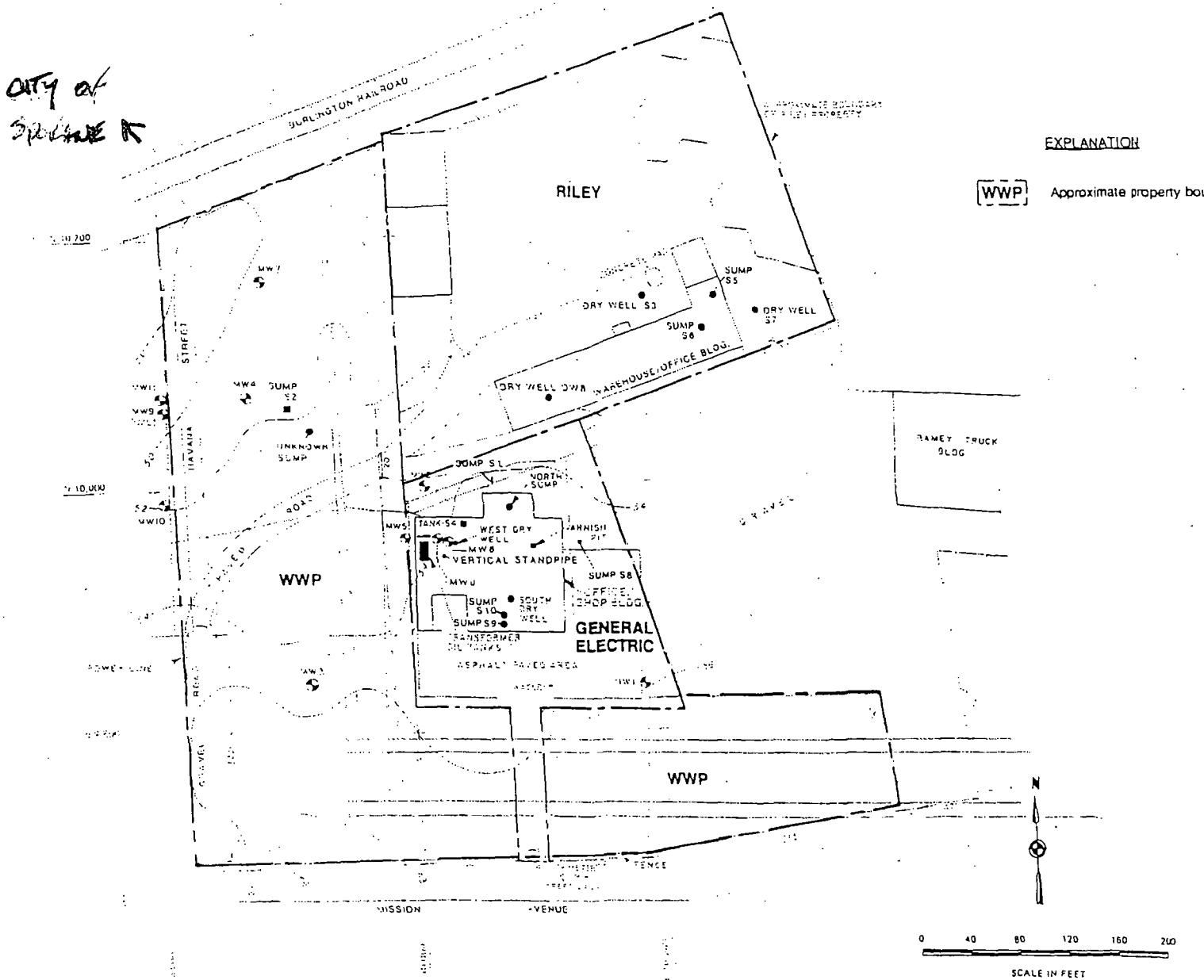
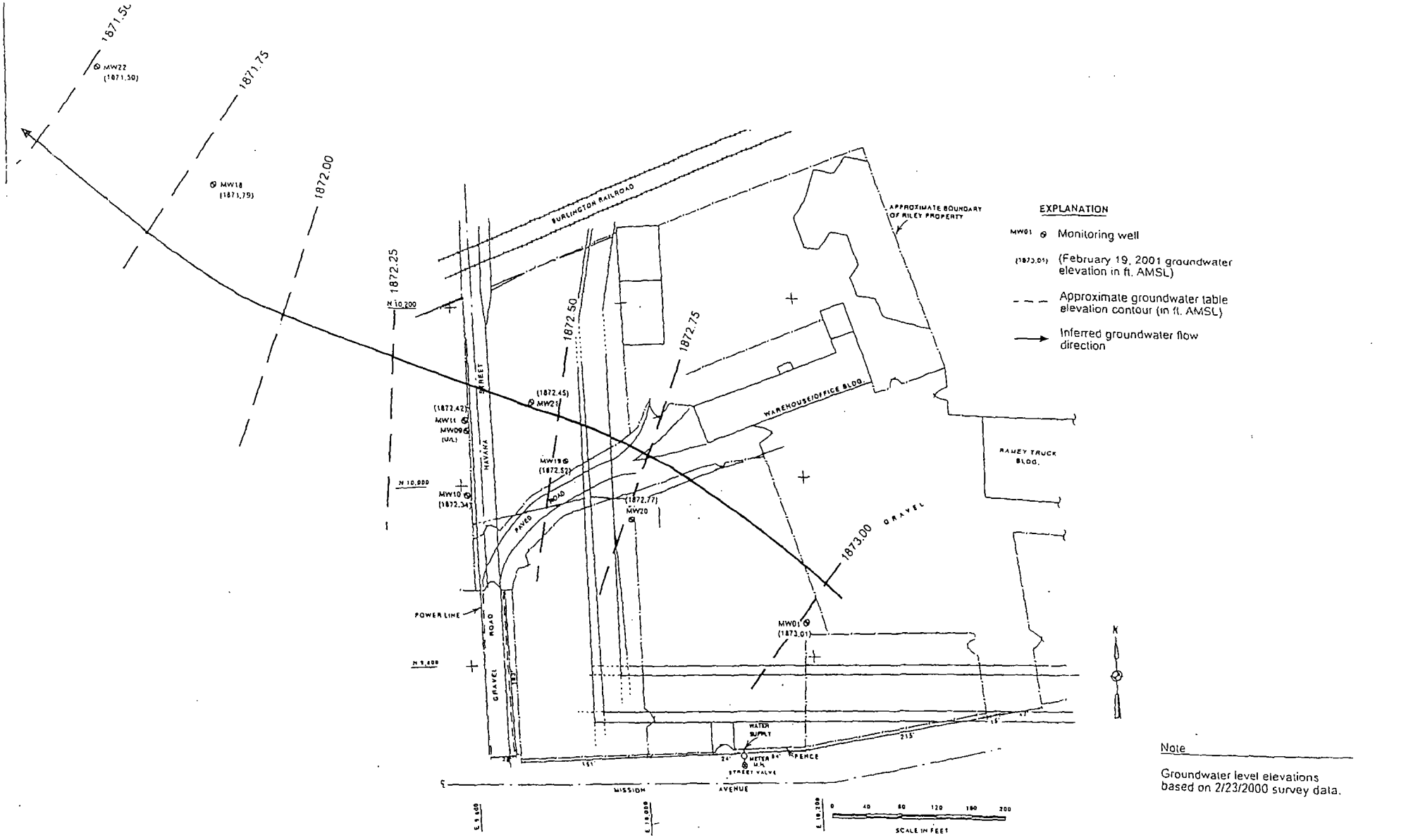


Figure 3: Well Locations and Typical Water Levels




Note

Groundwater level elevations based on 2/23/2000 survey data.

FIGURE 3-1
FIRST QUARTER 2001
GROUNDWATER CONTOUR MAP
GE SPOKANE/GROUNDWATER MONITORING/WA

PROJECT NO. 003-1250-1446 DRAWING NO. 96864 DATE 01/11/02 DRAWN BY FI

**Figure 4**
**Water elevations MW-1**
**GE/Spokane Site**

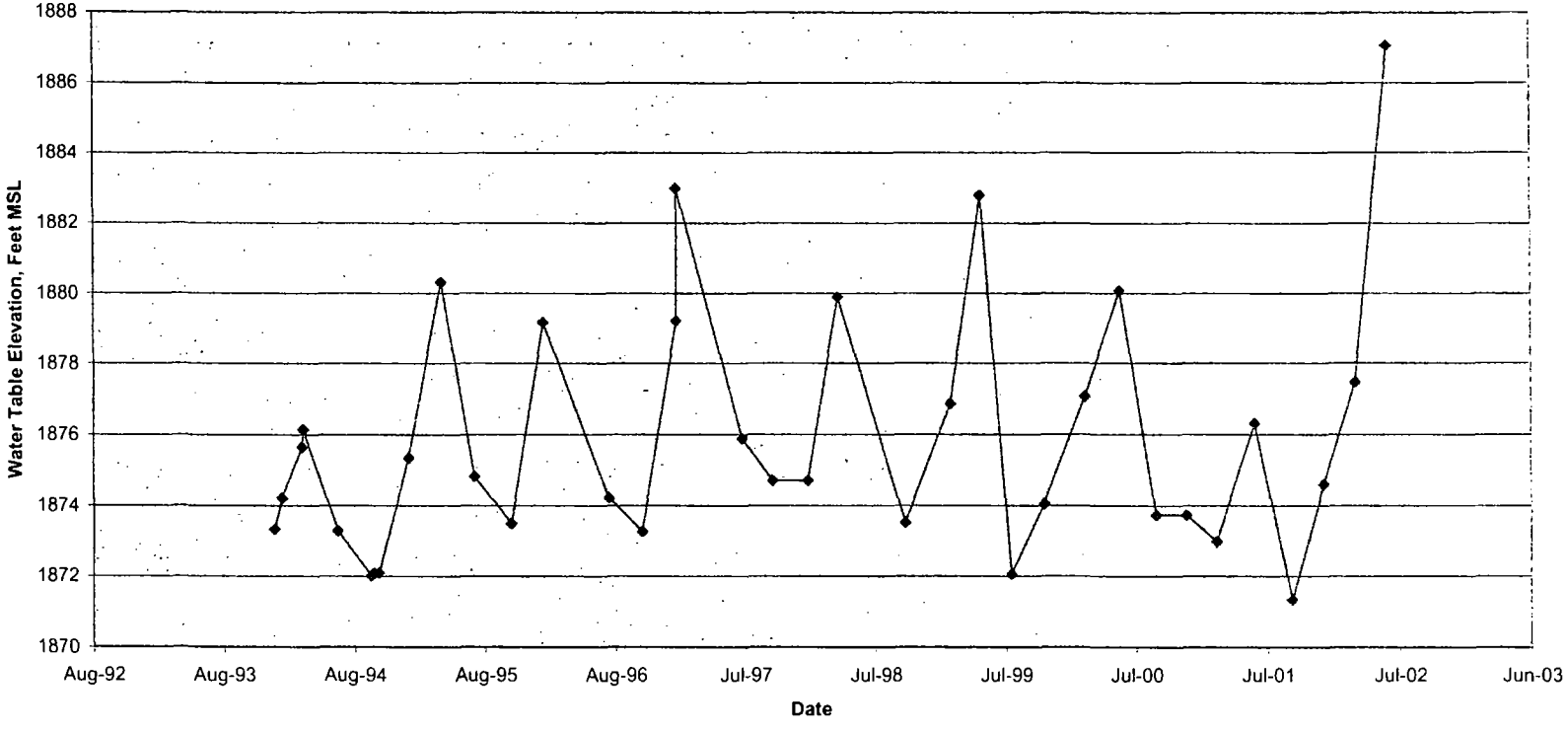


**Figure 5a**
**MW-5**
**Water Table Elevation and Aroclor 1260 Concentration**
**GE/Spokane Site**

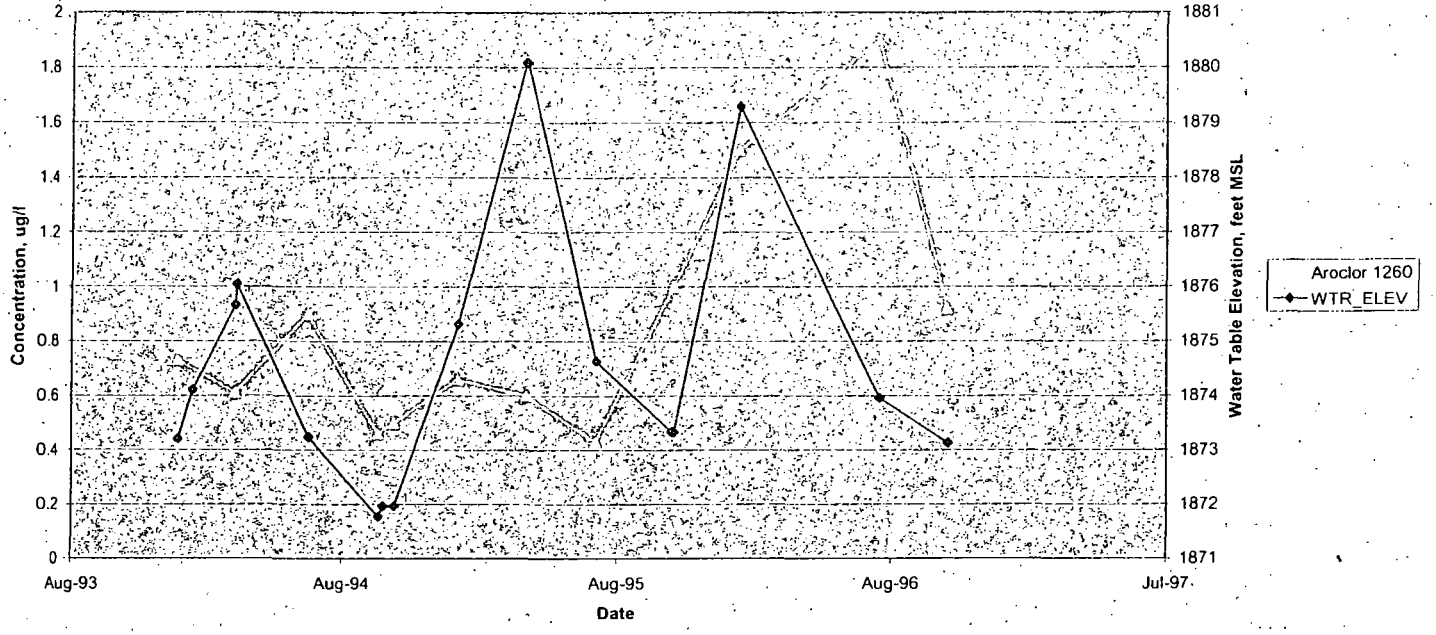



**Figure 5b**
**MW-11**
**Aroclor Concentration and Water Table Elevation**
**GE/Spokane Site**

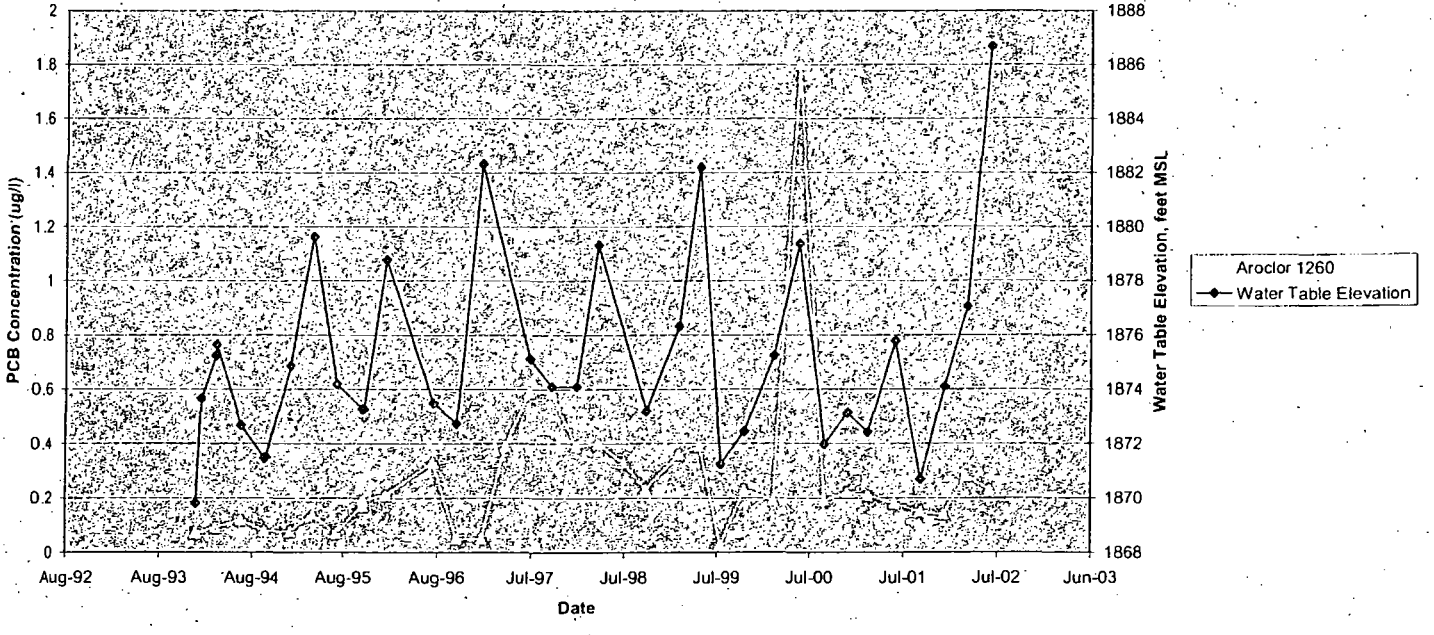


**Figure 5c**
**MW-18 PCB Concentration and Water Level**
**GE/Spokane Site**

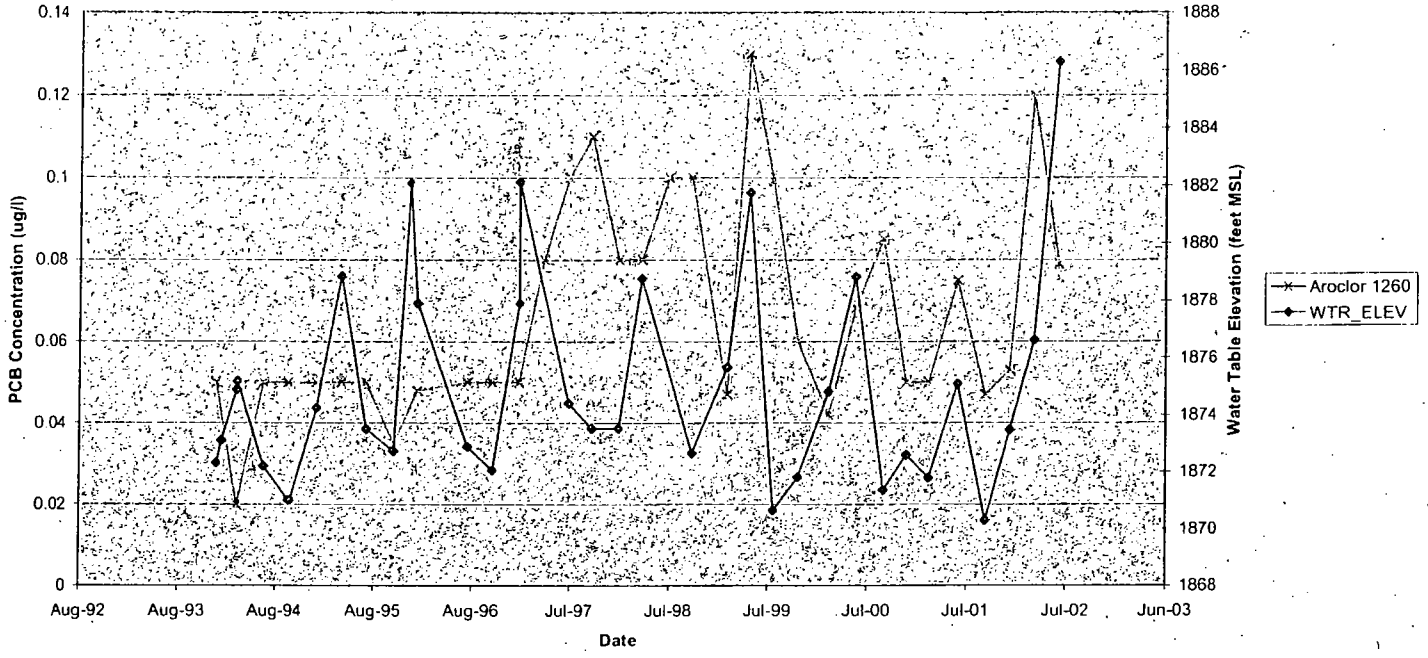



**Figure 5d**
**MW-19 PCB Concentration and Water Levels**
**GE/Spokane Site**

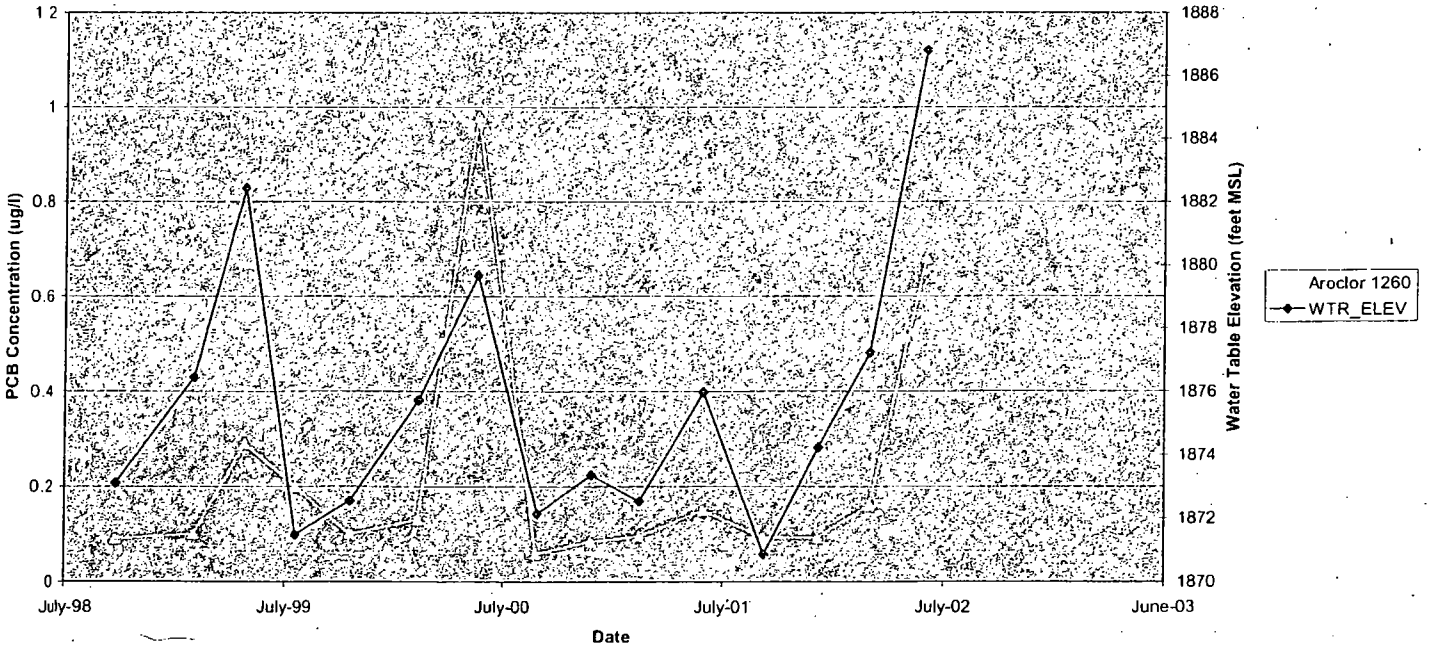


**Figure 5e**
**MW-20 PCB Concentration and Water Levels**
**GE/Spokane Site**

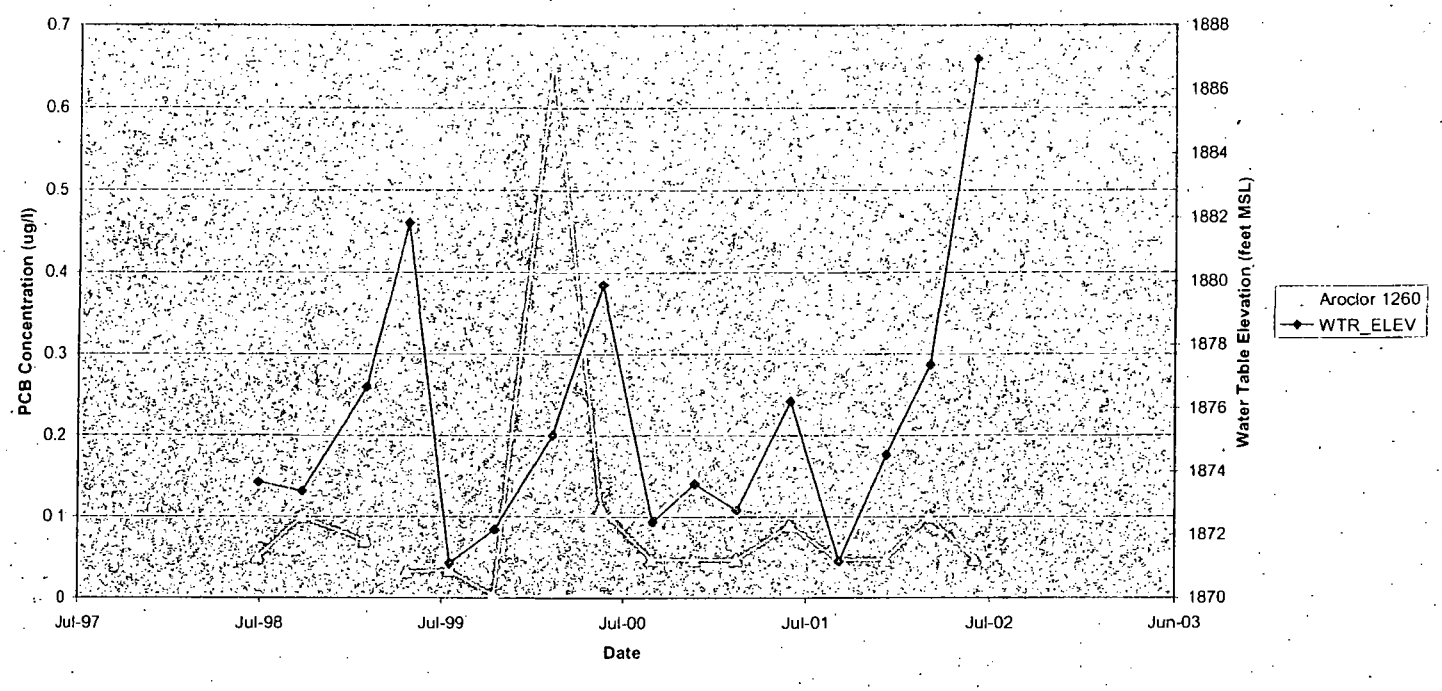



**Figure 5f**
**MW-21 PCB Concentration and Water Table Elevation**
**GE/Spokane Site**

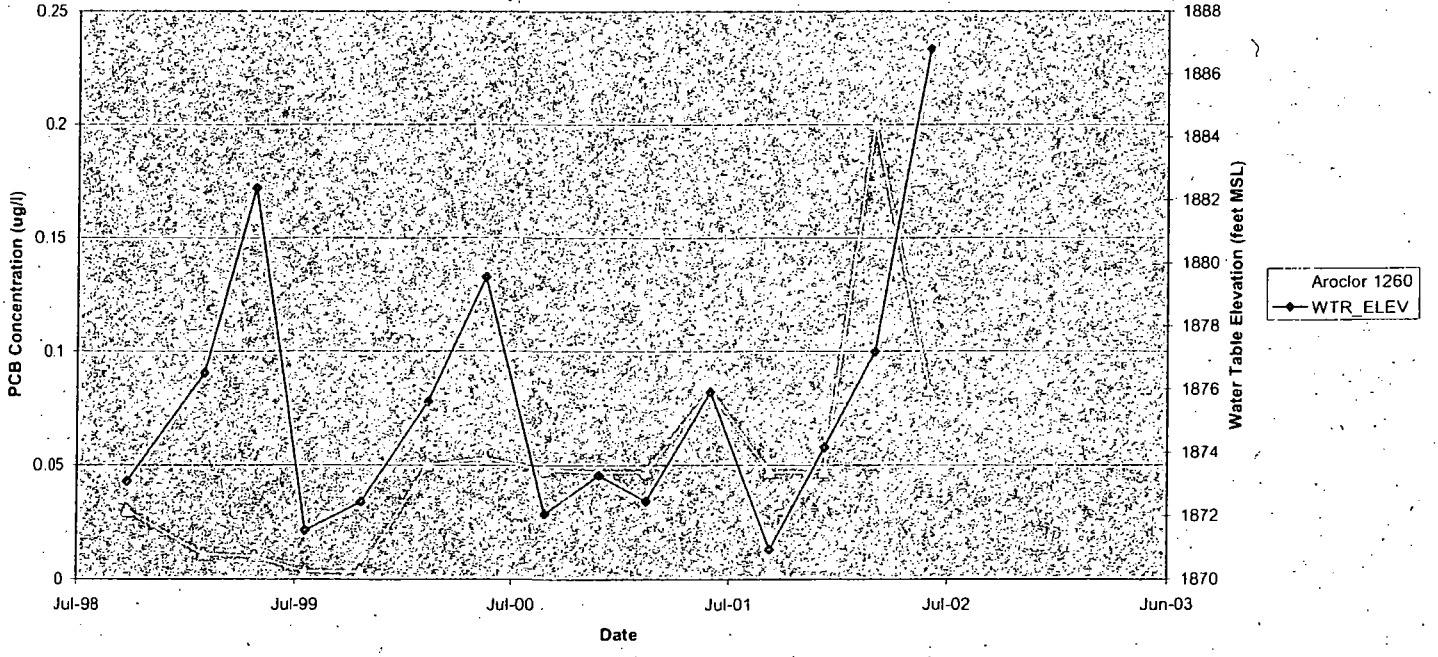


**Figure 6**
**2nd Quarter 2002 Split Sampling Event**
**GE/Spokane Site**

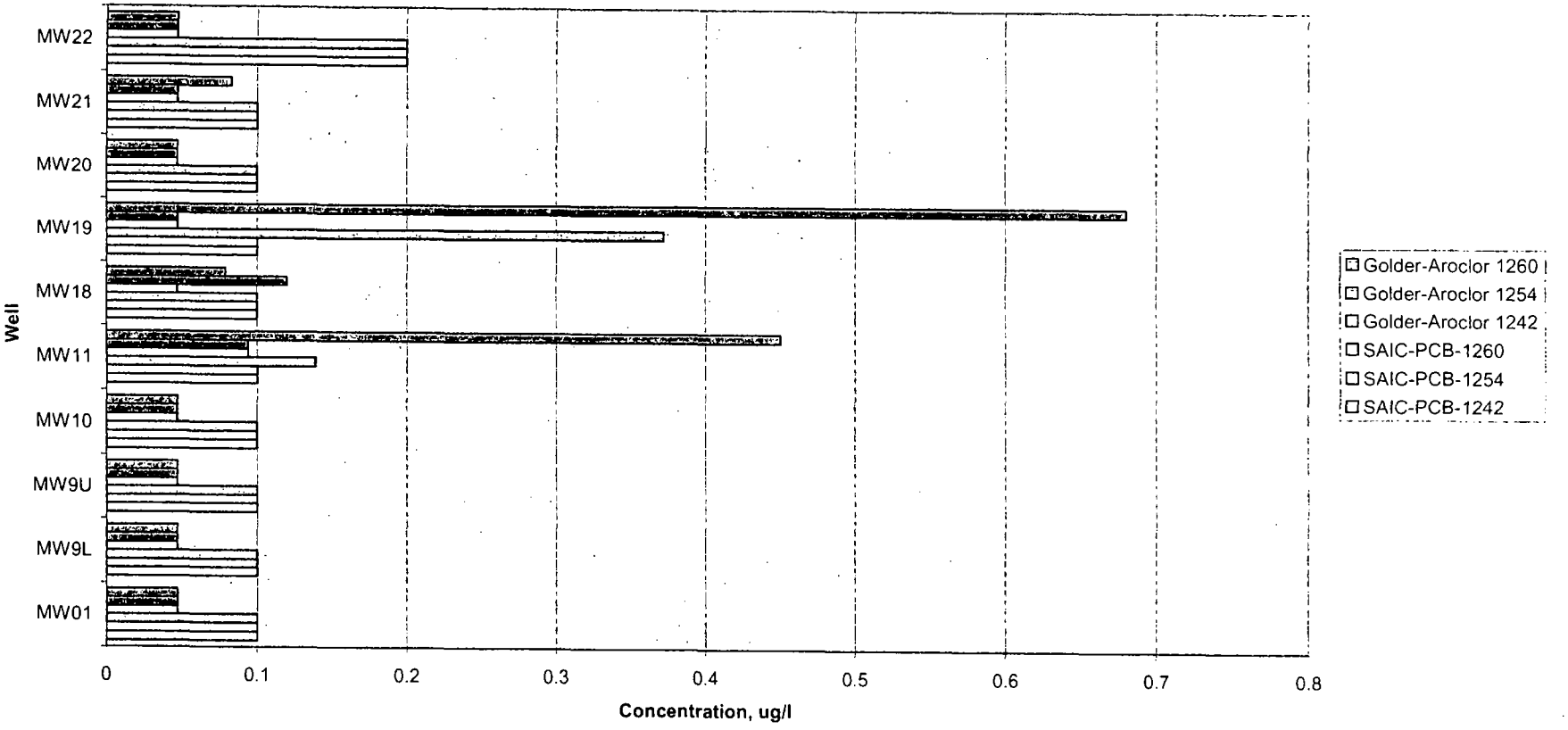
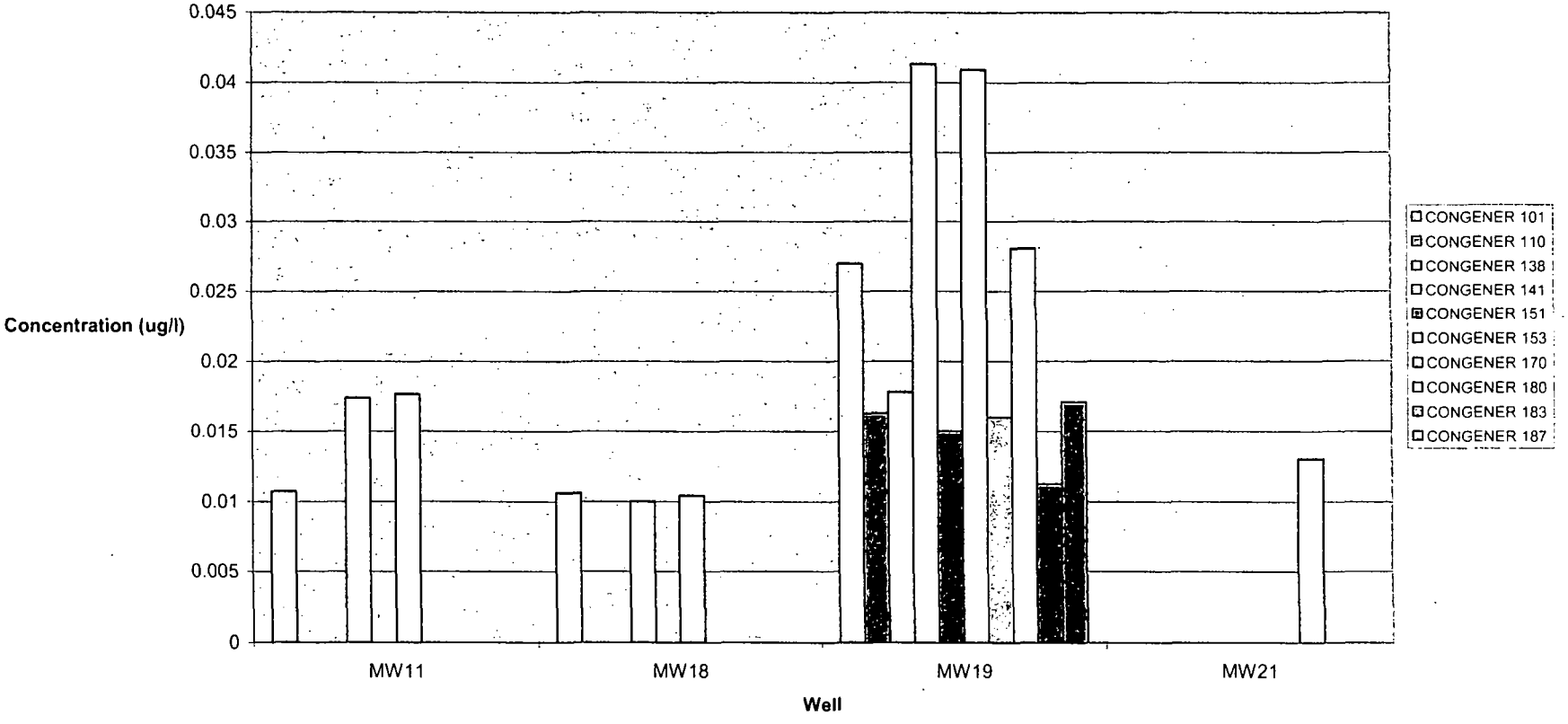
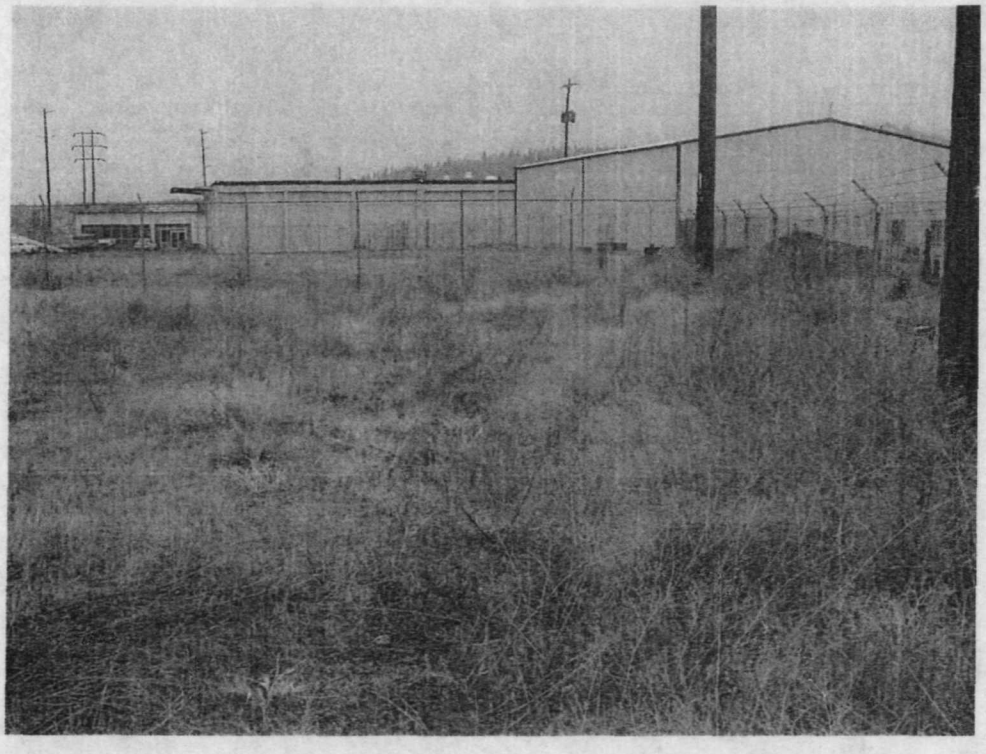


**Figure 7**
**PCB Congener Concentrations-Detected Congeners only**
**GE/Spokane**



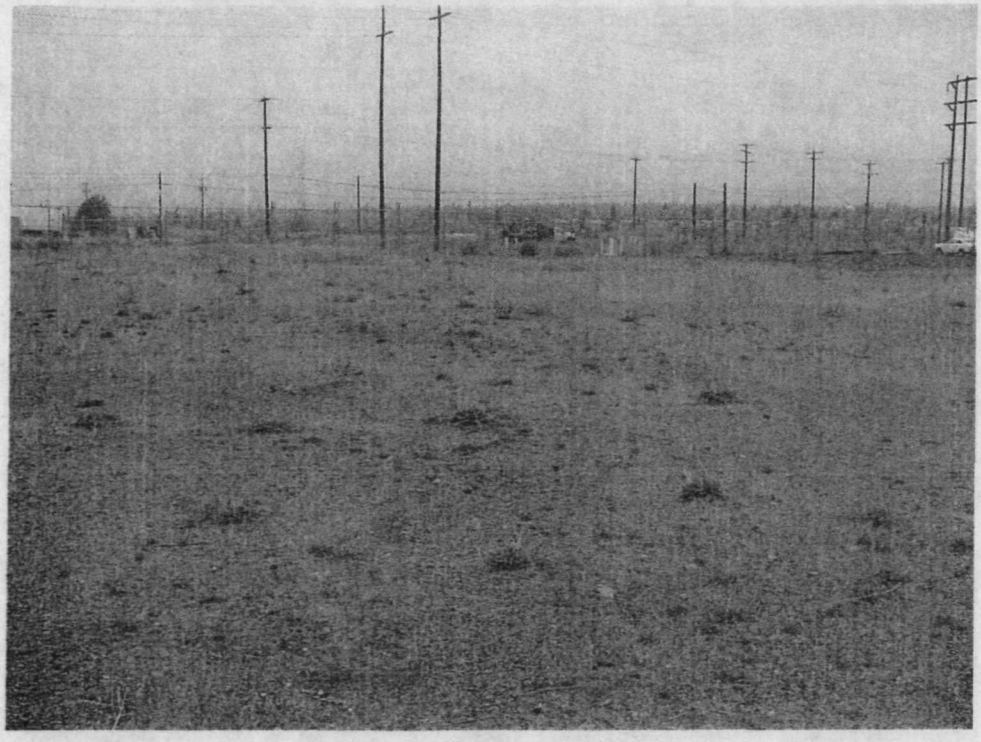
Appendix A
Site Inspection Photos

Looking west from southeast corner of property

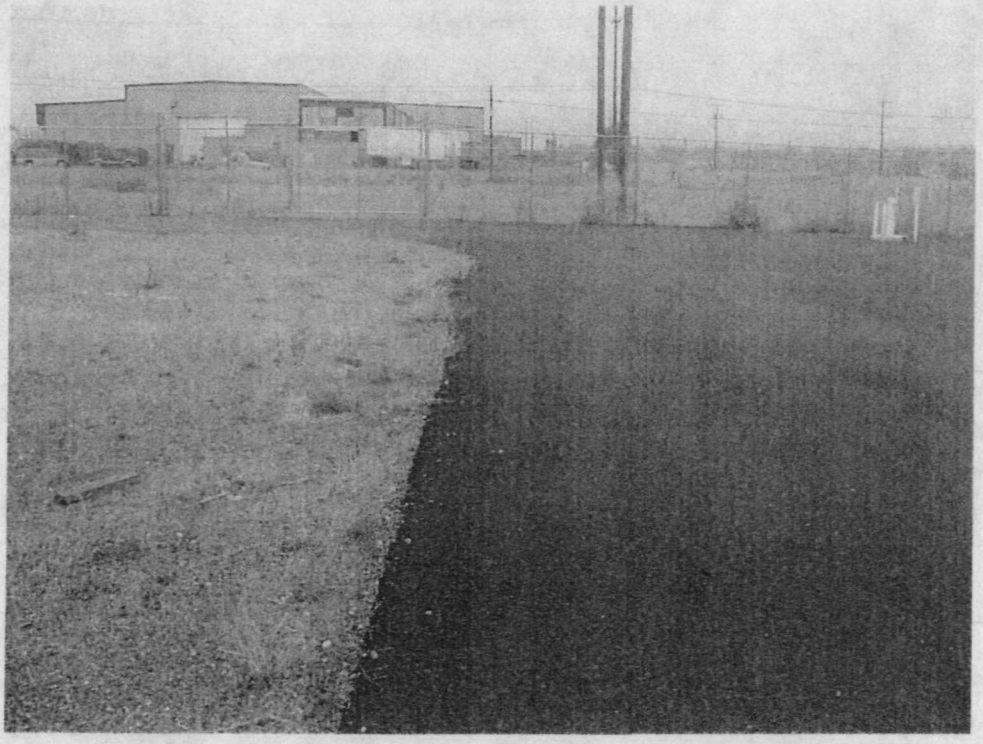


Looking north from southeast corner of property

Looking south from northwest corner of property



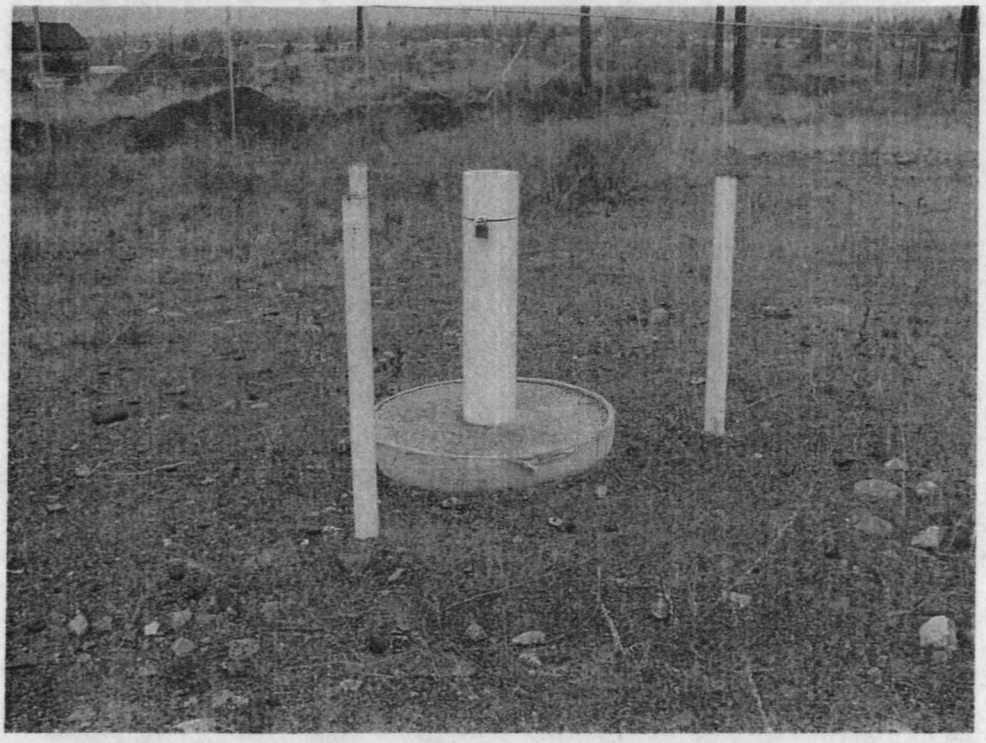
Looking northwest from MW-1



North side of asphalt cap

West side of asphalt cap

Vitrified soils



Typical well completion-MW-21